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National Organic Program  
USDA-AMS-TMP-NOP  
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RE: Sunset Recommendations – Aquatic Plant Extracts  
**Sent Via E-Mail to:** [Katherine.Benham@usda.gov](mailto:Katherine.Benham@usda.gov).

Sent Via Fax to: 202.205.7808

Dear Ms. Benham:

OMRI appreciates the opportunity to comment on the proposed renewal of sunset items on the USDA National List of Allowed and Prohibited Substances (National List), 7 CFR 205.601 – 205.606. As stated in previous comments, OMRI sees the Sunset process as an important and necessary step in maintaining the National List and keeping it up to date.

As a general rule, however, OMRI does not take position regarding the renewal or removal of any substances on the list. Only in cases where our work has identified confusion or a lack of clarity with resulting inconsistencies do we comment.

### **Executive Summary**

Aquatic plant products, including kelp and seaweed, are an important part of organic farming. They are widely used as fertilizers and soil amendments, and also have plant growth regulator properties. A wide variety of methods are used to prepare aquatic plant products for use in production. Some are dried, historically kelp was burned, and a number of different chemical solvents may be used to extract or concentrate various active constituents. Chemical preservatives are used in a number of products, particularly those in liquid form. Aquatic plant products that contain synthetic substances are generally prohibited for use in organic production, but an exception was made for extracts that used potassium hydroxide or sodium hydroxide as a solvent. OMRI is concerned that some manufacturers use excessive amounts of potassium hydroxide to fortify the potash analysis of their products. The NOSB is also asked to address petitions pending for potassium carbonate, phosphoric acid, and chemical preservatives used to formulate aquatic plant products.

## Current Situation

Organic farmers have long used aquatic plants and their extracts. Also known as seaweed and kelp, these products are derived from numerous different species, prepared a variety of ways, and applied both to the soil and as a foliar feed. Kelp is recognized as a potash fertilizer by the Association of American Plant Food Control Officials (AAPFCO, 2006). The principle benefit appears to be hormonal, as their natural extracts are rich in cytokinins, auxins, gibberellins, and amino acids (Mooney and van Staden, 1985; Verkleij, 1992; Stirk and van Staden, 1997; Edmeades, 2002). A review of the scientific literature referred to organic farming practices and indicated that synthetic extracts of aquatic plants, those containing synthetic preservatives such as formaldehyde, and products fortified with synthetic fertilizers were not acceptable for organic production (Verkleij, 1992).

The first Technical Advisory Panel review and National Organic Standards Board (NOSB) recommendation determined that aquatic plant extracts were not synthetic, and that they were allowed without being placed on the National List (NOSB, 1995a). At their following meeting, the NOSB raised the question of the synthetic reactions that take place with hydrolyzed aquatic plant products. The subsequent recommendation made for aquatic plant extracts recognized that some of the products historically used by organic farmers were extracted using either potassium hydroxide or sodium hydroxide (NOSB, 1995b).

The National Organic Program (NOP) accepted the NOSB's recommendation and put the following item on the National List.

205.601(j) As plant or soil amendments.

(1) Aquatic plant extracts (other than hydrolyzed)—Extraction process is limited to the use of potassium hydroxide or sodium hydroxide; solvent amount used is limited to that amount necessary for extraction.

While aquatic plant extracts are on the National List as a soil or plant amendment, they are restricted to alkali extraction by sodium hydroxide or potassium hydroxide only and cannot be fortified to contain more potash than is needed for extraction. Phosphoric acid and potassium hydroxide are prohibited as fertilizers under the NOP standards [7 CFR 205.105(a) and 7 CFR 205.203(e)(2)] and are inconsistent with the Organic Foods Production Act [7 USC 6508(b)].

Manufacturers continue to manufacture and sell both synthetic and non-synthetic fertilizer products from aquatic plants. OMRI currently lists two non-synthetic aquatic plant products, eight non-synthetic kelp meal products, and 22 synthetic kelp extract products. In addition, dozens of blended fertilizers contain synthetic aquatic plant extracts as an ingredient. OMRI urges the NOSB to consider both the potassium carbonate and phosphoric acid petitions, and use the review of those petitions as an opportunity to consider the necessity of keeping aquatic plant products on the National List. If aquatic plant extracts remain on the National List, the pending petitions can be used to help decide how to revise the annotation to make it more clear, consistent with the statute, and enforceable.

### Current Annotation

OMRI has concerns with the current annotation. The NOSB did not explain what is meant by 'other than hydrolyzed.' The annotation does not place a clear limit on the amount of potassium hydroxide needed for extraction, and has not considered the petitions for potassium carbonate and phosphoric acid. Also, the NOSB should consider the use of aquatic plant extracts as plant growth regulators, as these may be more appropriately considered as 'production aids' given their mode of action than as 'fertilizers.'

Many of the claimed effects of aquatic plant extracts are related to plant growth regulator properties, and not fertilizer value. Yet the listing is restricted to use as a plant and soil amendment. Use as a plant growth regulator would require the addition of aquatic plant extracts to 7 CFR 205.601(k)—Plant Growth Regulators. OMRI is considering revision of the *Generic Materials List* to reflect the NOP's prohibition of this use. In the USA, products marketed as plant growth regulators are regulated under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), and would need to be registered with the EPA unless they were exempt from registration under the 25-b exemption. If used according to the label, aquatic plant extracts that are EPA registered pesticides may not comply with the limitations on the National List.

### Extraction v. Fortification

As a result of concerns with levels of potash in some product applications, OMRI commissioned a study to look at the necessity of alkali extraction and the validity of claims. The Sunset Review and NOSB recommendation do not cite any published independent research that gives empirical evidence that show the necessity of alkali extraction. A review of the literature and of various production processes indicates that alkali extraction is **not** necessary (Henry, 2004). As pointed out above, there are a number of commercial products on the market that are simply dried and are non-synthetic. Active constituents can be extracted by mechanical processes (Hervé, 1977). Thus, the 'minimum needed' as stated in the annotation could be considered none.

Potash content in kelp may vary widely, but is expected to range from between 2.25 to 6.25% (Organic Gardening, 1978). Excessive use of either potassium hydroxide or potassium carbonate can potentially result in fortification of the aquatic plant extract with synthetic potassium, the key nutrient component of the fertilizer potash. Potassium hydroxide treated products have potash levels that range from 4.5% to in excess of 20% (Henry, 2004).

Potassium hydroxide is also recognized by AAPFCO as a potash fertilizer (AAPFCO, 2006). The allowance of potassium hydroxide for aquatic plant extract manufacturers gives them an advantage over the manufacturers of other fertilizers, and fortification enables them to market potassium hydroxide at a higher price than in the conventional fertilizer market. OMRI notes that some specialty fertilizer manufacturers are using kelp to make available soluble potash claims in excess of what would be available to them from untreated kelp. While some might argue that the use of potassium hydroxide as a fertilizer is uneconomical or that most organic farmers would use synthetic aquatic plant extracts for only a small percentage of their potash needs, the economic situation for organic inputs is different from the conventional fertilizer market. If cost was the sole consideration, kelp extracts would be made with sodium hydroxide, because sodium hydroxide is less expensive than potassium hydroxide.

### **Sodium Hydroxide and the Salt Index**

None of the OMRI listed products use sodium hydroxide as a solvent. The adverse effect of sodium is believed to be the reason that sodium hydroxide is not used in commercial preparations. Blunden, Challen, and Woods (1968) reported that a plain water extract performed better than an alkali extract made with sodium hydroxide. Aquatic plant extracts may already contain in excess of 3-4% sodium (Chapman and Chapman, 1980). Sodium hydroxide treatment can elevate the plant-available levels of sodium significantly (Blunden, Challen, and Woods, 1968). Sodium hydroxide extraction therefore appears not only unnecessary but potentially detrimental to organic farming due to the salt index. The original TAP review also identified salinity concerns, as did the Sunset Review (TAP, 2006). It was not clear, therefore, why the NOSB included sodium hydroxide in their recommendation.

### **Potassium Carbonate**

Some manufacturers use synthetic substances other than potassium hydroxide in preparing aquatic plant extracts for market. One substance used in particular is potassium carbonate. Sodium hydroxide and potassium hydroxide are more difficult to work with than potassium carbonate so several plant extract producers have chosen the safer material. One kelp manufacturer submitted a petition for listing of potassium carbonate (Pattison, 2002). It has been "under NOP review" since then.

The petition is incomplete, does not address several key criteria, appears to be for several substances in a formulated proprietary product, and contains apparently inaccurate information. The petition also refers to the use of an antimicrobial that has two active pesticides as agents. The petition erroneously mentions that OMRI permits the use of potassium carbonate. OMRI does not knowingly list any potassium carbonate extracted kelp products. Despite the errors and shortcomings of the petition, OMRI believes that as a substance potassium carbonate merits consideration by the NOSB and the petition should be referred to the TAP.

It is not clear how certifiers are interpreting the current annotation. As with potassium hydroxide, there is concern that potassium carbonate might be used to fortify products with a synthetic fertilizer. Until a decision is made on potassium carbonate, seaweed used in organic production may be extracted only using potassium hydroxide or sodium hydroxide.

### **Phosphoric Acid**

One manufacturer petitioned the NOSB to permit the use of phosphoric acid to lower the pH to a minimum of 3.5 (Conrad, 2002). Phosphoric acid is also used as a fertilizer. The NOSB determined that it is synthetically produced (NOSB, 1999). The National List does not permit fortification of the product with a synthetic fertilizer. Potassium hydroxide and phosphoric acid react to synthesize potassium phosphate, with a pH of between 4.4 and 4.7 (Merck, 2001). A pH of 3.5 is lower than the reaction product, and could be achieved with saturating the potassium hydroxide buffer with excess phosphoric acid. The petitioner acknowledges that it is the same reaction that produces fertilizers, but offers no basis from the criteria to support the need for a pH of 3.5 (Conrad, 2002).

The NOSB should address the phosphoric acid petition using the criteria established in OFPA. In doing so, the NOSB should respond to the NOP's letter to the petitioner that interprets the current annotation to permit the use of phosphoric acid in aquatic plant products.

"We have determined that the substance for the specific petitioned use, does not have to be petitioned because its use as a pH adjuster in aquatic plant extracts is currently not prohibited [in the annotation]...The only restrictions specified are that 1) the extraction process is limited to the use of potassium hydroxide or sodium hydroxide, and 2) the solvent amount used is limited to the amount necessary for extraction. No other restrictions are identified. Therefore, aquatic plant extracts, as long as manufacture consistent (sic) with the restrictions specified in 205.601(j)(1) are allowed as synthetic substances for use in organic crop production, including the use of phosphoric acid to adjust the pH of the aquatic plant extracts."<sup>1</sup>

This interpretation appears to contradict the intent of the original NOSB recommendation to restrict synthetics only to sodium hydroxide and potassium hydroxide, and limit the amount used to the minimum needed for the extraction process. It would be helpful for NOSB to reaffirm the intent of the original annotation, and get the NOP to clarify that no synthetic substances other than sodium hydroxide and potassium hydroxide are allowed in aquatic plant extracts. Until phosphoric acid appears on the National List for use with aquatic plant extracts, OMRI can not knowingly list such products.

The petition for phosphoric acid refers to the current annotation for fish. The allowance of phosphoric acid in fish is based on documented legitimate concerns for putrefaction and human pathogens in products that are not stabilized, and the efficacy of phosphoric acid to maintain a pH of 3.5 in their treatment (Windsor and Barlow, 1981). The maximum phosphoric acid is well-defined at a verifiable pH of 3.5, and is limited only to liquid products [7 CFR 205.601(j)(7). Finally, the statute authorized an exception for fish emulsions is [7 USC 6517(c)(1)(B)(i)]. By contrast, the annotation on the National List limits the use of potassium hydroxide in aquatic plant extracts 'other than hydrolyzed' and permits only the minimum amount of solvent needed for extraction.

## Conclusion

Aquatic plant extracts have a long history in organic production, and OMRI recognizes that many products are currently on the market. However, there is evidence that the amount of potassium hydroxide used exceeds the minimal usage that was traditionally practiced, and that fertilizer manufacturers may use this loophole to introduce a range of synthetic fertilizers previously not accepted in organic production, apparently inconsistent with the OFPA. OMRI requests the following of the NOSB and NOP if aquatic plant extracts remain on the National List:

## Recommendations

1. The NOSB should advise the NOP to establish the minimum amount of potassium hydroxide or sodium hydroxide needed to extract aquatic plants.

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<sup>1</sup>Arthur Neal, NOP to David Hiltz, Acadian Seaplants Ltd Feb. 6, 2004

2. If the NOSB determines that alkali is not needed for aquatic plant extracts, then aquatic plant products should not be renewed after the Sunset period.
3. If the NOSB determines that alkali-treated aquatic plant extracts are needed in organic production, the NOSB should help the NOP establish clear enforceable limits on the amount of alkali used in extraction to assist certifiers, manufacturers, and others to interpret the annotation.
4. The NOSB should help the NOP draft a statement that potassium hydroxide and phosphoric acid are prohibited for use in organic production as fertilizers, whether they happen to be contained in humic acid derivatives, liquid fish products, or aquatic plant extracts.
5. The NOSB should address the petitions for phosphoric acid, potassium carbonate, and preservatives used to manufacture aquatic plant extracts.

Thank you for your consideration,

A handwritten signature in black ink, appearing to read "David H. DeCou". The signature is fluid and cursive, with the first name "David" and last name "DeCou" clearly distinguishable.

David DeCou  
Executive Director

## References

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